

CONSENSUS RECOMMENDATIONS

For A

Western North Atlantic Coastal

Bottlenose Dolphin Take Reduction Plan

FROM THE

BOTTLENOSE DOLPHIN

TAKE REDUCTION TEAM

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TABLE OF CONTENTS

Executive Summary..... 3

Introduction..... 4

Common Elements and Definitions..... 4

Research, Monitoring and Observer Coverage..... 6

Education and Outreach..... 24

Blue Crab Pot Fishery..... 26

Management Units..... 27

- Summer Northern Migratory Management Unit..... 27
- Summer North Carolina Management Units..... 28
- Winter Mixed Stock Management Unit..... 29
- North Carolina Beach-based Fishing Practices..... 32
- South Carolina, Georgia and Florida Management Units..... 33

Appendices

- A: Bottlenose Dolphin Take Reduction Team Membership..... 36
- B: Bottlenose Dolphin Take Reduction Team Meeting Schedule..... 39
- C: Availability of Meeting Summaries..... 39
- D: Bottlenose Dolphin Take Reduction Team Letter to Dr. Hogarth Regarding the Analysis of the Winter 2002 Survey..... 39
- E: Recommendations for the North Carolina Management Units in Tabular Form..... Separate

EXECUTIVE SUMMARY

The National Marine Fisheries Service (NMFS) convened the Take Reduction Team (the Bottlenose Dolphin Take Reduction Team or BDTRT; see appendix A) as stipulated by the Marine Mammal Protection Act to develop recommendations for a Take Reduction Plan for the western North Atlantic coastal bottlenose dolphin (*Tursiops truncatus*). The BDTRT met in a series of five meetings (appendices B and C) from November 2001 to April 2002 and reached consensus on the recommendations reported herein. The BDTRT believes that the recommendations will bring the take of bottlenose dolphin below Potential Biological Removal (PBR) levels for coastal bottlenose dolphins.

The members of the BDTRT reached a general agreement that the recommendations they adopted constitute an acceptable basis for a Take Reduction Plan at this time. The members of the BDTRT want and expect to meet again during the public comment period for the proposed rule. They also want and expect to meet periodically to review the emerging data, assess the performance of the Take Reduction Plan, and make recommendations about updates to and refinements of the plan. The members of the BDTRT currently await the expedited analysis and review of the new abundance and PBR estimates generated from the 2002 winter survey and formally requested by the BDTRT in a consensus letter to the NMFS Assistant Administrator (appendix D).

Recommendations for Management Units

The BDTRT worked under the assumption that there were multiple management units of western North Atlantic coastal bottlenose dolphin found off the east coast from New Jersey to Florida. The structure of these management units is still not clearly understood. Additionally, the distribution of these management units vary by season. For these reasons, the NMFS proposed seven management units, with three units including a seasonal definition. The BDTRT used these management units to organize its deliberations and most of the recommendations are directed to the various management units. For those management units with fewer takes of bottlenose dolphin and where PBR levels are not currently exceeded, the BDTRT offered non-regulatory recommendations. For those management units where the currently defined PBR is being exceeded, the BDTRT has suggested both regulatory and non-regulatory recommendations. Regulatory recommendations apply to certain fisheries (primarily gillnet fisheries) and generally seek to reduce soak times, reduce the amount of gear that would be in the water, or change practices to limit interactions and take of bottlenose dolphins.

Overarching Recommendations

The BDTRT also adopted by consensus some recommendations that cut across the management units. Education and outreach was initially discussed for every management unit. The ideas were then reviewed and pulled together into a single block. Similarly, the issues of improved research (other than gear research), monitoring, strandings data, and observer coverage were initially discussed in bits and pieces as the different management units were addressed. The various needs and suggestions were pulled together into a set of recommendations for the entire range of the coastal bottlenose dolphin. Since the blue crab pot fishery is prosecuted along the entire coastal range, a set of recommendations was developed for this fishery, rather than addressing it in the recommendations for every management unit.

INTRODUCTION

The National Marine Fisheries Service (NMFS) convened the Take Reduction Team (the Bottlenose Dolphin Take Reduction Team or BDTRT; see appendix A) as stipulated by the Marine Mammal Protection Act to develop recommendations for a Take Reduction Plan for the western North Atlantic coastal bottlenose dolphin (*Tursiops truncatus*). The BDTRT met in a series of five meetings (appendices B and C) from November 2001 to April 2002 and reached consensus on the recommendations reported herein. The BDTRT believes that the recommendations will bring the take of bottlenose dolphin below Potential Biological Removal (PBR) levels for coastal bottlenose dolphins.

The members of the BDTRT employed the notion of trying to achieve “pragmatic consensus” for the recommendations they adopted. This idea was originally proposed by the organizational sociologist Rensis Likert. He suggested that a group should use as its decision rule a general agreement to accept and implement an option or solution for a stated period of time. The group would commit to examining the solution at the end of the agreed upon time. The group would determine whether the solution has worked, if another approach would be warranted, what refinements might be needed, and so on. This notion of “pragmatic consensus” fits wonderfully with the BDTRT’s intentions. The members of the BDTRT reached a general agreement that the recommendations they adopted constitute an acceptable basis for a Take Reduction Plan at this time. The members of the BDTRT want and expect to meet again during the public comment period for the proposed rule. They also want and expect to meet periodically to review the emerging data, assess the performance of the TRP, and make recommendations about updates to and refinements of the plan.

The members of the Bottlenose Dolphin Take Reduction Team reached consensus and offer the following recommendations.

COMMON ELEMENTS AND DEFINITIONS

The following section presents definitions of terms and elements that are found throughout the recommendations made for the different management units. The members of the BDTRT determined that these should be addressed in a separate section and at the beginning of the recommendations.

Regulated Waters

With the exception of the recommendation for mandatory skipper training, and except where otherwise noted in these recommendations, regulated portions of the Bottlenose Dolphin Take Reduction Plan (BDTRP) will apply to all U.S. waters within twelve (12) kilometers of shore from the New York-New Jersey border southward to Cape Hatteras, North Carolina and within 27 kilometers of shore from Cape Hatteras southward to, and including, the east coast of Florida, with the exception of the areas exempted.

Exempted waters will be all waters landward of the first bridge over any embayment, harbor, or inlet or all waters landward of the 72 COLREGS line in those instances where there is no bridge over said embayment or harbor close to the mouth of said embayment or harbor, as in the case of Delaware Bay, except where specifically needed and noted in the BDTRP, as in the case of Pamlico Sound.

For the blue crab pot fishery, the Bottlenose Dolphin Take Reduction Plan will apply to waters landward of the first bridge over any embayment, harbor, or inlet or all waters landward of the 72 COLREGS line in those instances where there is no bridge over said embayment or harbor close to the mouth of said embayment or harbor, as in the case of Delaware Bay, except where specifically needed and noted in the BDTRP, as in the case of Pamlico Sound.

(Note: There was considerable discussion about the use of bridges versus the use of the COLREGS line to delineate the regulated waters. The decision was made to use of the bridges in part because they are further inshore than the COLREGS line.)

Estimates of Abundance and Potential Biological Removal (PBR) Levels for the Management Units

The effectiveness of management measures recommended by the Bottlenose Dolphin Take Reduction Team depends heavily on the reliability of scientific input provided to the team, including (among other things) stock abundance, PBR levels, and numbers of animals actually taken by the fisheries. The data available to the team are confounded by considerable uncertainty. For the North Carolina winter management unit, for example, the team was presented with abundance estimates from 1995 and 2002, the results of which varied greatly and raised important questions about the status and tolerable levels of take from this management unit. The abundance estimate from 1995 was based on a combination of two surveys that resulted in an overall estimate of 6,474 dolphins in this region. However, this estimate may or may not be a good indicator of current abundance; in addition to the fact that it is based on data that are seven years old, the surveys were limited in geographic coverage and one was designed for a different purpose, they did not include a correction for $g(0)$ - the probability of detecting animals directly under the surveying aircraft, and the resulting estimate lacked precision. The 2002 survey resulted in an initial abundance estimate of 21,771 bottlenose dolphins. This estimate was based on a more rigorous design, attempted to assess and incorporate $g(0)$, and was reported as more precise. However, this estimate was preliminary and had not been peer-reviewed when provided to the team, there are unresolved questions about the analysis upon which the estimate is based, and the estimate is confounded by overlap in the distribution of coastal and offshore ecotypes. Because abundance estimates are used as an indicator of stock status and are also used in the calculation of PBR levels, the team urged that abundance estimates be reviewed by the Scientific Review Group and that reliable estimates be developed as soon as possible, whether through review of existing data or new surveys, to provide a more reasonable basis for conservation of dolphin stocks without undue restraints on the fisheries.

Bycatch estimates are similarly uncertain. For example, observer coverage is only available in one of the fisheries known to interact with bottlenose dolphins - the Mid-Atlantic coastal gillnet fishery - and observer coverage in that fishery historically has been less than two percent. Other fisheries, with known or expected bottlenose dolphin interactions, have never been observed and bycatch estimates are unavailable for those fisheries. The lack of adequate information on bycatch, as well as abundance, was a significant impediment to the team's ability to develop appropriate management recommendations for both reducing the bycatch level and assessing the efficacy of the recommended measures.

Enforcement and Implementation

State and federal agencies are strongly encouraged to work cooperatively in the enforcement and implementation of the BDTRP.

Gear Modifications

With respect to gear modifications, the BDTRT recognized the difficulty of proving with complete certainty the efficacy of potential gear modifications, but nonetheless recommends that research be done whenever possible to investigate the utility of such modifications so that fishers are not required to make unnecessary changes or changes that have no effect on the rate of take of bottlenose dolphins. The BDTRT should be consulted about any proposed gear modifications potentially affecting the take of bottlenose dolphins.

Night

Night means one hour after sunset to one hour prior to sunrise, as officially published or as broadcast by NOAA Radio.

This definition will apply to all pertinent recommendations unless night is specifically defined otherwise.

RESEARCH, MONITORING, AND OBSERVER COVERAGE

Research and Monitoring

Recommendations

With respect to research and monitoring, the bottlenose dolphin take reduction team makes the following recommendations to the Service.

- A. Continue research on stock structure to confirm existing stock delineations and to

evaluate stock affiliations of dolphins in inland waters (bays, estuaries, sounds).

- B. Design and conduct rigorous scientific surveys to provide reliable (unbiased, precise) abundance estimates for the stocks under consideration.
- C. Conduct research on the affected dolphin stocks to determine if they are depleted under the Marine Mammal Protection Act.
- D. With respect to assessment of bycatch levels:
 - 1. Develop effective monitoring strategies for all fisheries and gear types to reliably determine the level of interaction with coastal bottlenose dolphins.
 - 2. Develop and implement reasonable monitoring standards such as the level of observer coverage needed to address interaction issues with an acceptable level of certainty.
 - 3. Increase monitoring coverage where existing levels do not meet minimal standards.
 - 4. Disperse monitoring effort temporally and geographically to ensure that monitoring requirements of the Marine Mammal Protection Act are addressed for all stocks.
 - 5. Provide more robust assessment of the specific factors contributing to dolphin mortality or serious injury.
 - 6. Provide better assessment of fishery effort.
 - 7. Explore and expand stranding networks for collection of data pertinent to bottlenose dolphin/fishery interactions. Include training, equipment, support, and better communication among participants (stranding network members, managers, local authorities, scientists, and fishers).
 - 8. Consider alternative monitoring methods and, in particular, additional use of alternative observation platforms.
- E. With respect to research related to recommended gear modifications, the team recommends completion of the following projects that are already funded or that are expected to be funded. The team requests a report on the status of the following projects within the next year.
 - 1. Compare behavior of captive and wild dolphins around gill nets with and without acoustically reflective webbing – Hohn et al.

2. Observe nets deployed in North Carolina using overhead video and hydrophones to observe nets (Read et al.).
 3. Investigate the effects of twine stiffness and acoustically reflective webbing on dolphin bycatch (Read et al.).
 4. Investigate gear catchability/fishability with different twine sizes and acoustically reflective webbing on kingfish data in North Carolina (Read et al.) and on gill nets in New Jersey (Marks et al.).
 5. Investigate effects of lowering floatlines below the surface and resulting catchability/fishability in Florida shark driftnet fishery (National Marine Fisheries Service).
 6. Investigate effects of reducing net depth (smaller number of meshes) and resulting catchability/fishability in Florida shark driftnet fishery (National Marine Fisheries Service).
- F. With respect to research related to recommended gear modifications, the team recommends funding and completion of the following projects.
1. Investigate bridle alterations to prevent collapsing of the net and elimination of bridles on anchored gillnet gear with respect to their potential effects on the likelihood of bottlenose dolphin interactions.
 2. Investigate the behavior of anchored gill net gear with regard to likelihood of entanglement a) when net panels are laced together and b) when they are not laced together, leaving gaps between nets.
 3. Investigate the effects of different string designs (i.e., shallower net depth, hung in different parts of the water column) to determine if the amount of webbing can be reduced without affecting catch for different fisheries (especially small mesh in coastal waters).
 4. Determine if dolphins that appear to be attracted to boats or nets in North Carolina waters are interacting with gill net gear, attempt to identify such dolphins, and investigate their behavior and mortality rate.
 5. Investigate the importance of time of day and time from set with respect to when dolphins are caught in gear, based on carcass temperature and soak times.
 6. Investigate the effectiveness of inverted bait wells in crab pots to prevent bottlenose dolphins from removing bait from pots and from being caught in trap lines.
 7. Investigate the effects of reducing slack in lead lines of pound nets that

interact with dolphins.

Justification for recommendations

I. Scientific information needed by the take reduction team

The Marine Mammal Protection Act was passed due, in part, to concerns about unacceptably high levels of mortality and serious injury of marine mammals interacting directly with commercial fisheries. The 1994 amendments to the Marine Mammal Protection Act provide a detailed framework for managing commercial fisheries causing such mortality and serious injury. The major elements of the framework include 1) identification of marine mammal stocks, 2) assessment of each stock, 3) determination of each stock's status, 4) assessment of direct fisheries-related mortality and serious injury for each stock, 5) categorization of stocks (i.e., strategic) and fisheries (i.e., categories I, II, and III) of special concern, and 6) provisions for reducing mortality or serious injury of animals within a stock when they occur at unacceptably high levels (Figure 1). The framework provides assurance that marine mammal stocks are adequately protected from direct fisheries-related mortality and serious injury only to the extent that the above elements are adequately achieved or implemented.

The Secretary of Commerce is required to develop and implement a take reduction plan to assist in the recovery or prevent the depletion of each strategic stock that interacts with a commercial fishery causing frequent or occasional mortality or serious injury of marine mammals. Strategic stocks are 1) those with human-caused mortality in excess of the potential biological removal level (PBR; defined below), 2) those that are, or are about to be, listed as endangered or threatened under the Endangered Species Act, or 3) those that are listed as depleted under the Marine Mammal Protection Act. The immediate goal of a take reduction plan is to reduce, within 6 months of its implementation, the incidental mortality or serious injury of marine mammals incidentally taken in the course of commercial fishing operations to less than PBR. The long-term goal of a plan is to reduce, within 5 years of its implementation, the incidental mortality or serious injury of marine mammals incidentally taken in the course of commercial fishing operations to insignificant levels approaching a zero mortality and serious injury rate, taking into account the economics of the fishery, the availability of existing technology, and existing state or regional fishery management plans.

The efforts of the take reduction team and the efficacy of the take reduction plan are highly dependent upon the availability of scientific information describing stock identification, abundance, status, and tolerance for and estimated levels of fishery-related mortality and serious injury. Inaccurate, unreliable, or incomplete information poses a variety of risks to the protected species, fishers, and fisheries involved. In the following sections we discuss the information available to the take reduction team for bottlenose dolphins off the eastern U.S. coast, the adequacy of such information, the potential consequences when the information was deemed inadequate, and the need for research or monitoring to provide the essential information. The availability of essential, reliable information is necessary to ensure that the take reduction process achieves its required

goals.

A. Stock identification

Accurate identification of stocks is necessary to ensure that individual stocks are not subjected to intolerable levels of take. The Marine Mammal Protection Act defines a population “stock” as “a group of marine mammals of the same species or smaller taxa in a common spatial arrangement, that interbreed when mature.” Such stocks are the basic units of management and are characterized by various parameters including abundance, status and trends, PBR, and incidental mortality and serious injury.

The stock structure of coastal bottlenose dolphins was estimated on the basis of observed geographic separation, genetic distinctiveness, telemetry studies and photo-identification records indicating movement patterns, and isotope ratio analyses indicating feeding in different regions or at different latitudes. Most of the available data pertain to stocks in the waters off or north of North Carolina. Fewer data are available for bottlenose dolphins south of North Carolina, and stock separation in this area is tentative. Stock affiliation for coastal animals in inland waters (bay, estuaries, and sounds) also is poorly understood, and these dolphins were excluded in many of the scientific studies reviewed by the team including, for example, estimates of abundance of various stocks.

When stock structure is poorly understood, the primary risk to a dolphin stock is that its tolerance for human-caused mortality may be overestimated if either its abundance is overestimated or its actual take level is underestimated. The risk of excessive take from a single stock can be exacerbated when multiple stocks are being managed but the characteristics of each stock (abundance, take levels) can not be accurately determined. The available information is not sufficient to describe fisheries-related risks to inland animals, as the assessment of risk is highly dependent upon whether or not they form one or more separate stocks or belong to the stocks found in outer coastal waters. Conversely, fishers and fisheries are at increased risk of over-regulation if abundance is underestimated or take levels are overestimated.

Recent research on stock structure has resulted in a significantly improved understanding of the stock structure of bottlenose dolphins along some regions of the eastern U.S. coast. Nonetheless, the bottlenose dolphin take reduction team recommends continued research on stock structure to confirm existing stock delineations and to evaluate stock affiliations of dolphins in inland waters (bays, estuaries, sounds).

B. Stock abundance and trends

Abundance estimates are essential for determination of trends and population size relative to the optimum sustainable population level, and for calculation of PBR. For the bottlenose dolphin stocks covered by this plan, abundance is estimated

from counts conducted during aerial or shipboard surveys, and from photo-identification data combined with mark-recapture technology. The abundance estimates are based on at least three main assumptions: (1) the counts themselves are reliable (i.e., reasonably accurate and precise) and reasonably extrapolated to a total population estimate, (2) the seven stocks can be separated from each other on the basis of geographic distribution during the periods or seasons when counting occurs and (3) the seven coastal stocks can be separated from offshore stock(s) when counting occurs.

The team considered estimates of abundance for certain stocks covered by these take reduction recommendations to be unreliable. For the North Carolina winter management unit, for example, the team was presented with abundance estimates from 1995 and 2002, the results of which varied greatly and raised important questions about the status and tolerable levels of take from this management unit. The abundance estimate from 1995 was based on a combination of two surveys that resulted in an overall estimate of 6,474 dolphins in this region. However, this estimate may or may not be a good indicator of current abundance: in addition to the fact that it is based on data that are seven years old, the surveys were limited in geographic coverage and one was designed for a different purpose, they did not include a correction for $g(0)$ - the probability of detecting animals directly under the surveying aircraft, and the resulting estimate lacked precision. The 2002 survey resulted in an initial abundance estimate of 21,771 bottlenose dolphins. This estimate was based on a more rigorous design, attempted to assess and incorporate $g(0)$, and was reported as more precise. However, this estimate was preliminary and had not been peer-reviewed when provided to the team, there are unresolved questions about the analysis upon which the estimate is based, and the estimate is confounded by overlap in the distribution of coastal and offshore ecotypes. Because abundance estimates are used as an indicator of stock status and are also used in the calculation of PBR, the team urged that abundance estimates be reviewed by the Scientific Review Group and that reliable estimates be developed as soon as possible, whether through review of existing data or new surveys, to provide a more reasonable basis for conservation of dolphin stocks without undue restraints on the fisheries. The take reduction team developed its recommendations based on the 1995 estimate, but expressed great concern that the abundance of each of the affected bottlenose dolphin stocks is poorly known.

The most obvious consequence of uncertainty regarding stock abundance is that PBR levels, which are a direct function of stock abundance, are also uncertain. If PBR levels are overestimated, then the stock may be exposed to unknown but excessive levels of risk from human-caused mortality. If PBR levels are underestimated, then fishers and fisheries may be unduly restrained by unnecessary regulations. Based on the significance of abundance estimates in determining the PBR levels of the affected stocks and the significance of potential Type I and II errors, the bottlenose dolphin take reduction team strongly recommends that the Service design and conduct rigorous scientific surveys to provide reliable (unbiased, precise) abundance estimates for the stocks under

consideration. Such surveys will require a method or methods for avoiding bias resulting from the potential presence of offshore dolphins in the area counted. Such surveys also need to include dolphins in inland waters.

C. Stock status

Under the Marine Mammal Protection Act, marine mammal stocks are designated or categorized for several different purposes. For the purpose of assessing whether stocks are functioning elements of the marine ecosystem, stocks are either within the optimum sustainable population range (i.e., not depleted) or are designated as depleted (i.e., below their maximum net productivity level, which is the lower bound of the optimum sustainable population). As noted above, for matters related to stock assessment and the taking of marine mammals incidental to commercial fisheries, stocks are categorized as “strategic” if (1) they are, or are about to be, listed as endangered or threatened under the Endangered Species Act, (2) they are listed as depleted under the Marine Mammal Protection Act, or (3) they experience a level of direct human-caused mortality that exceeds PBR.

In 1993 the National Marine Fisheries Service designated the coastal migratory stock of bottlenose dolphins as depleted based on scientific evidence that perhaps as much as 50 percent or more of the stock perished in the 1987-88 die-off along the eastern coast of the Atlantic from New Jersey to Florida. Although the maximum net productivity level for the coastal migratory stock has not been determined, this level is assumed for most marine mammal stocks to occur at about 60 to 65 percent of the environmental carrying capacity. If the stock was at carrying capacity prior to the 1987-88 die-off and declined by 50 percent, then it should have been below its maximum net productivity level and therefore met the criterion for the depleted listing.

Although the Service’s most recent stock assessment reports for bottlenose dolphin stocks along the eastern coast of the United States are still based on a coastal migratory stock and an offshore stock, new scientific evidence (mentioned earlier) indicates that the coastal migratory stock may be comprised of an assemblage of at least seven smaller stocks. For that reason, this draft take reduction plan and the measures recommended herein are based on and tailored to seven coastal bottlenose dolphin stocks.

All of these seven stocks are not necessarily depleted just because the original coastal migratory stock was designated as such. Unfortunately, the information needed to determine whether each of these seven newly recognized stocks is depleted is not available. For that reason, they also may not be strategic if the sole basis for placing them in this category is that they were once part of a larger assemblage of stocks designated as depleted. However, they would be correctly categorized as strategic if the total of human-caused mortality for each stock exceeded its PBR. Although the question of whether these stocks are depleted or would qualify for a depleted listing cannot be resolved at this time, they can be

determined to be strategic on the basis of estimated levels of mortality and serious injury compared to their PBR levels. Nonetheless, the bottlenose dolphin take reduction team recommends that the Service conduct research on the affected dolphin stocks to determine if they are depleted under the Marine Mammal Protection Act.

D. Bycatch estimation

The management framework established by the 1994 amendments to the Marine Mammal Protection Act can be effectively implemented only if bycatch levels are measured with sufficient reliability (accuracy and precision) to determine if and when excessive take is or may be occurring. The purpose of a take reduction team is to recommend measures that will reduce the number of takes to a tolerable level, and the efficacy of recommended measures can only be assessed if bycatch levels can be reliably estimated. Thus, reliable estimation of bycatch is fundamental to the identification and description of interaction problems and to feedback regarding the efficacy of the management response.

The bottlenose dolphin take reduction team questioned the effectiveness of existing observer programs for detecting bycatch and changes in bycatch of coastal bottlenose dolphins in the management units under consideration. Observation or monitoring of some fisheries is either absent altogether or insufficient to allow even minimal estimates of bycatch of coastal bottlenose dolphins. For the fisheries that are observed, the data do not provide the precision needed to estimate bycatch levels with confidence (Table 1; note coefficient of variation about the take estimates) and the estimated power of the observer-based monitoring program to detect a real change in the bycatch rate of coastal bottlenose dolphins in gillnets is unacceptably low (Table 1). The term “power,” as used here, means the probability of detecting a significant change (e.g., reduction) in dolphin bycatch if such a change occurs. The take reduction team was concerned that the existing monitoring scheme was not sufficiently powerful to detect reliably a change in the rate of mortality consistent with a reduction of total mortality to PBR or below that level for a

Management Unit	Landings (metric tons)	Observer coverage (metric tons observed/ metric tons landed)	Estimated Mortality	C.V.	Power
Winter - Mixed North Carolina	3728.53	1.87%	93	49.2%	0.32
Winter - Mixed Virginia	923.15	2.77%	53	84.4%	0.18
Summer Northern Migratory Unit	937.70	3.16%	30	48.1%	0.08
Summer Northern NC Unit	268.76	2.94%	26	61.2%	0.12
Summer Southern NC Unit	181.24	2.68%	0	NA	0.00

Table 1. Mid-Atlantic gillnet landings, percent coverage by the Northeast Fisheries Science Center observer program, estimated mortality, coefficient of variation, and power of observer data and analyses to detect real change in the bycatch rate of coastal bottlenose dolphins in gillnets. Data presented for the year 2000 by coastal bottlenose dolphin management units.

particular management unit. For example, current PBR for the winter North Carolina mixed management unit is 24 animals. Using the 2000 landings data as the unit of effort and PBR as the expected level of take, the expected take rate is $24/3,729$ mt or 0.0064 dolphins per metric ton landed. The observed rate of occurrence in 2000, derived from estimated mortality, was $93/3,729$ mt or 0.0249 dolphins per metric ton landed. With a sample size of 70 mt (1.87 percent observer coverage), the probability of detecting a reduction in the bycatch rate to a level needed to achieve the PBR goal was 0.32 or 32 percent. This low level of power indicates that existing monitoring and bycatch estimation methods will not provide a sufficient basis for determining with confidence whether the required reduction in coastal bottlenose dolphin mortality has or has not been achieved for this management unit. Similarly, at the request of the team, analysts estimated that if 48 dolphins from this management unit (two times the PBR) were actually killed annually and observer coverage stayed at the 2001 level, there would be a 3 percent chance that one or more mortalities would be observed. A three-fold increase in observer coverage would be necessary to provide a 57 percent chance of detecting at least one of 48 mortalities. Observer coverage of about 10 percent would be required to provide statistical confidence that a reduction of bycatch to PBR has been achieved. As indicated in Table 1, the monitoring system appears to be even less effective for other management units.

In addition to problems with the overall level of coverage, it appears that the existing coverage is not well dispersed to assess coastal bottlenose dolphin mortality. Ten of 12 observed mortalities (83 percent) between 1995 and 2000 occurred within state waters (out to 4.8 km offshore), but state waters have consistently had the lowest level of coverage (measured as percent landings observed; Figure 2). The best available information on coastal dolphins is that they occur primarily in nearshore waters out to about 12 km. Observation effort in these waters, if kept at current levels, will not be adequate to determine the actual level of take from individual stocks or management units with an acceptable level of precision.

The low level of observer coverage also impedes collection of important data on the nature of interactions between coastal bottlenose dolphins and commercial fisheries. The information provided from observed mortality events suggests possible factors related to the probability of a dolphin take (e.g., soak time, mesh size, distance from shore), but will not be sufficient to provide a suitable level of confidence that the measures being considered to reduce bycatch are effective.

More coverage is needed to further investigate the important factors determining the level of dolphin mortality.

In addition, collection of data on fishing effort was limited and inconsistent, particularly within state waters for all involved states. Consequently, analysts were required to use landings as a proxy for effort. More suitable measures of effort (e.g., amount or number of nets deployed, number of net hauls per trip, haul duration, etc.) are essential to provide information on the relation of dolphin bycatch and fishing effort. Since it is well known that landings may vary widely with effort both within a single fishery and among fisheries, modified data collection methods for fish harvested in state waters are needed to ensure a better measure of effort is available.

Due to limited observer coverage, analysts were required to combine data for a period of 5 years to estimate take levels. If five years of data are required to determine whether the initial measures recommended by the team are effective at reducing mortality to PBR, then feedback to the team and management on the efficacy of recommended and implemented efforts by the team and management will be significantly delayed and additional time will likely be required to develop and implement measures required to achieve the zero mortality rate goal.

Stranding data have also been used by the team, primarily to confirm that takes are occurring and, in some cases, can reasonably be attributed to fisheries. Stranding data, as presently collected, is of limited utility due to potential biases. Stranding coverage is not even over all areas where animals may strand, members of stranding networks bring different levels of expertise to stranding events and the data collected may be more or less accurate depending on the experience and training of the responder, the data may not be collected and reported in a consistent fashion, and interpretation of the data may be inconsistent throughout the range where dolphins strand. Determination of cause of death, for example, can be very difficult to assess, as evidence of a fishery interaction is not necessarily confirmation that death was due to the fishery interaction. Nonetheless, the evidence collected by stranding network members proved to be very important, even if limited, in providing evidence of interactions. For that reason, the role of stranding networks to supplement monitoring efforts should be explored and expanded. In doing so, the Service should involve stranding network members, federal and state enforcement officers, fishers, gear specialists, and other experts to improve the observation, assessment, reporting, and response to stranded bottlenose dolphins. Participants should be provided adequate levels of training and support (e.g., equipment) to accomplish their required objectives. Importantly, communication between stranding network members, observer programs, researchers, and fishers should be enhanced to ensure more thorough and reliable collection of data, comparisons of observations, feedback to fishers, and full use of available expertise and resources aimed at reducing bycatch.

In addition to increased observer coverage and expansion of stranding networks,

the Service should consider alternative monitoring methods. For example, directed beach surveys or focused observer effort may be necessary to assess interaction levels during seasons or in areas when and where they are more likely to occur. Another suggestion made during team deliberations was that the Service expand use of alternative observation platforms in the form of medium size (20-25') vessels with a Service authorized skipper to operate in the mid-Atlantic gillnet observation program. These alternative platforms could more effectively observe small boat coastal fisheries that operate in 1) the northern migratory areas of New Jersey through Virginia in the summer months and in northern North Carolina in the winter months; 2) central North Carolina from Cape Hatteras to Cape Lookout throughout the year; 3) from Cape Lookout to the North Carolina/ South Carolina border.

The alternative platforms collect data comparable to that collected by shipboard observers and thereby supplement the observer program. The concept of alternative observation platforms has been successful in the Columbia River Gillnet Observer Program in the early 1990s and in the initial stages of the mid-Atlantic gillnet observation program. To date, the mid-Atlantic alternative platform has proved its effectiveness in observing multiple haul-backs of multiple vessels per day, which is generally not possible with shipboard observers. In addition, the skipper will be able to assist with issues of total fishing effort coming from a port, set length (time in water), area restrictions and retrieval of by-caught carcasses which will allow for the determination of stock and general health assessment among others. This is imperative to assign mortality to separate stocks and should be a component of the standard observer program as well. In addition, the alternative platform may be used to direct enforcement or to enforce mitigation measures recommended by the team and implemented by the Service (e.g., buoy flag colors and night proximity rules).

The key questions with respect to the overall monitoring program are 1) can the level of take be estimated with a reasonable level of accuracy and precision, and 2) what modifications in monitoring are needed to provide the evidence needed to ensure that the implemented measures have their desired effect without undue detrimental effects on fishers and the fisheries. It is beyond the scope of the take reduction team to design or develop the necessary monitoring program. Nonetheless, standards for monitoring should be established to ensure a reasonable level of confidence that the ultimate goals of the 1994 amendments to the Marine Mammal Protection Act are being achieved; i.e., take levels are reduced to tolerable levels without undue burden on the fishers and fisheries.

For the above-mentioned reasons, the bottlenose dolphin take reduction team recommends that the Service:

1. Develop effective monitoring strategies for all fisheries and gear types to reliably determine the level of interaction with coastal bottlenose dolphins.

2. Develop and implement monitoring standards such as the level of observer coverage needed to address interaction issues with a reasonable level of certainty.
3. Increase monitoring coverage where existing levels do not meet minimal standards.
4. Disperse monitoring effort temporally and geographically to ensure that monitoring requirements of the Marine Mammal Protection Act are addressed.
5. Provide more robust assessment of the specific factors contributing to dolphin mortality or serious injury.
6. Provide better assessment of fishery effort.
7. Explore and expand stranding networks for collection of data pertinent to bottlenose dolphin/fishery interactions. Include training, equipment, support, and better communication among participants (stranding network members, managers, local authorities, scientists, and fishers).
8. Consider alternative monitoring methods and, in particular, additional use of alternative observation platforms.

II. Research related to measures recommended by the bottlenose dolphin take reduction team

In addition to the research needed to improve background information provided to the team, additional research is needed to more fully investigate the nature of bottlenose dolphin takes and the efficacy of potential changes to fishing methods or gear. The effects of the gear modifications and “best management practices” recommended by the team are largely unknown and may or may not be sufficient to achieve their intended purpose of lowering mortality of coastal bottlenose dolphins. Research on these recommendations and monitoring of their effects will therefore be essential to ensure that adequate management measures are in place and dolphin mortality is reduced accordingly.

The team recognized the difficulty of proving with complete certainty the efficacy of potential gear modifications, but nonetheless recommends that research be done whenever possible to investigate the utility of such modifications so that 1) appropriate and effective measures are in place and 2) fishers are not required to make unnecessary changes, or changes that have no effect on the take rate of bottlenose dolphins. Again, such research should be an ongoing process to expeditiously move the fisheries toward the PBR goal required within six months and the zero mortality rate goal required by five

years.

A. Projects already funded or expected to be funded in the near future

The team requests a report on the status of the following projects within the next year.

1. Compare behavior of captive and wild dolphins around gill nets with and without acoustically reflective webbing – Hohn et al.
2. Observe nets deployed in North Carolina using overhead video and hydrophones to observe nets (Read et al.).
3. Investigate the effects of twine stiffness and acoustically reflective webbing on dolphin bycatch (Read et al.).
4. Investigate gear catchability/fishability with different twine sizes and acoustically reflective webbing on kingfish data in North Carolina (Read et al.) and on gill nets in New Jersey (Marks et al.).
5. Investigation of effects of lowering floatlines below the surface and resulting catchability/fishability in Florida shark driftnet fishery (National Marine Fisheries Service).
6. Investigation of effects of reducing net depth (smaller number of meshes) and resulting catchability/fishability in Florida shark driftnet fishery (National Marine Fisheries Service).

B. Projects not yet funded

1. Investigate bridle alterations to prevent collapsing of the net and elimination of bridles on anchored gillnet gear with respect to their potential effects on the likelihood of bottlenose dolphin interactions.
2. Investigate the behavior of anchored gill net gear with regard to likelihood of entanglement a) when net panels are laced together and b) when they are not laced together, leaving gaps between nets.
3. Investigate the effects of different string designs (i.e., shallower net depth, hung in different parts of the water column) to determine if the amount of webbing can be reduced without affecting catch for different fisheries (especially small mesh in coastal waters).

4. Determine if dolphins that appear to be attracted to boats or nets in North Carolina waters are interacting with gill net gear, attempt to identify such dolphins, and investigate their behavior and mortality rate.
5. Investigate the importance of time of day and time from set with respect to when dolphins are caught in gear, based on carcass temperatures and soak times.
6. Investigate the effectiveness of inverted bait wells in crab pots to prevent bottlenose dolphins from removing bait from pots and from being caught in trap lines.
7. Investigate the effects of reducing slack in lead lines of pound nets that interact with dolphins (based on stranding data).

III. Research identified in a draft conservation plan for the bottlenose dolphin stocks of the eastern U.S. Atlantic coast.

The take reduction process can reasonably be viewed as a part of an overall management strategy to recover and conserve bottlenose dolphins as functioning elements of their marine ecosystems. The Service was in the process of reviewing a draft conservation plan for bottlenose dolphins off the eastern U.S. coast when the take reduction team convened. The new information on coastal bottlenose dolphin stock structure in this region requires some modification to the draft plan, but much of the information in the plan, including an outline of research needs, remains timely and pertinent.

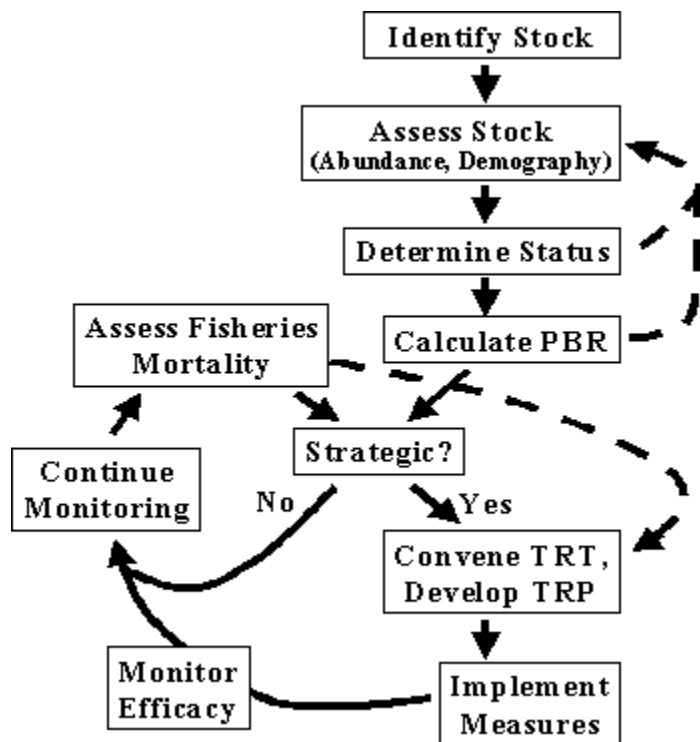
The team did not consider in detail the research outline in the draft plan. The team also recognized that some elements of the plan may have already been funded or accomplished. And the team recognized that some of the elements of the research outline were not directly related to issues pertinent to fisheries interactions, and therefore were beyond the purview of the team. Nonetheless, a comparison of the team's recommendations and the research outline indicates substantial overlap and, in particular, emphasizes the importance of research related to stock structure, abundance, status, and interactions with fisheries. For that reason, the outline from that draft plan is included here.

- 1 Identify stock structure of coastal bottlenose dolphins
 - 1.1 Genetic Analysis
 - 1.1.1 Discrimination of offshore vs. coastal forms and distributions using biopsy sampling
 - 1.1.1.1 Directed sampling
 - 1.1.1.2 Analysis of existing samples
 - 1.1.2 Directed Biopsy sampling of known individuals from coastal stock(s)
 - 1.1.2.1 Directed sampling

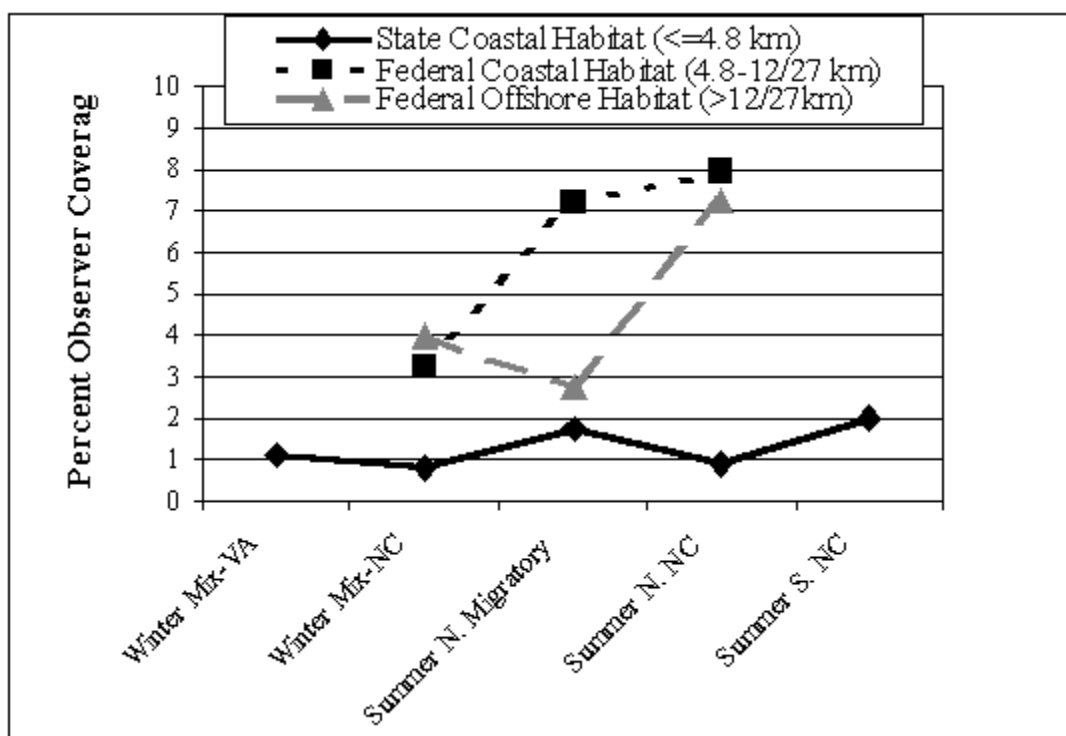
- 1.1.2.2 Analysis of existing samples
 - 1.1.3 Analysis of genetic samples from stranded animals with known sighting histories
 - 1.2 Photo-ID central catalogue
 - 1.2.1 Continue analysis of matches between sites
 - 1.2.2 Update images from existing sites
 - 1.2.3 Include images from sites that are not represented or under-represented
 - 1.2.4 Include images of distinctive fins from stranded individuals
 - 1.2.5 Direct biopsy sampling and telemetry of known individuals
 - 1.2.6 Maintain catalogue as long-term resource
 - 1.3 Conduct life history analyses to address potential for reproductive isolation among stocks
 - 1.4 Use satellite-linked telemetry to resolve unresolved questions from genetic and photo-ID efforts
 - 1.5 Complete morphometric analyses
 - 1.6 Conduct analyses of food habits and stable isotopes
 - 1.7 Conduct analyses of spatial and temporal variation in presence and levels of contaminants
 - 1.8 Conduct meta-analysis of matched samples
- 2 Generate accurate, current population estimates for each stock of coastal bottlenose dolphins
- 2.1 Conduct concurrent ship-board line transect surveys and biopsy sampling from the surf zone to the Gulf Stream from Florida to New Jersey during summer
 - 2.2 Conduct photo-ID mark recapture studies and biopsy sampling in bays, sounds and estuaries
- 3 Quantify anthropogenic removals for each stock of coastal bottlenose dolphins
- 3.1 Continue mid-Atlantic gillnet fishery observer program
 - 3.2 Estimate by-catch levels in other fisheries
 - 3.3 Collect biological samples from all observed takes to determine stock of origin
 - 3.4 Continue assessment of fisheries interactions and collection of biological samples from stranded animals to direct fishery observer programs
 - 3.5 Identify new or existing fisheries for which observer programs are required
 - 3.6 Identify and quantify other sources of anthropogenic mortality
- 4 Conduct assessments for each stock of coastal bottlenose dolphins
- 4.1 Prepare Take Reduction Plans for strategic stocks
 - 4.2 Continue to monitor abundance on a periodic basis
 - 4.2.1 Ocean waters
 - 4.2.2 Bays, sounds, and estuaries and limited coastal areas
 - 4.3 Estimate human-caused mortality and serious injury on an annual basis

- 4.4 Conduct simulation models to identify recovery levels
- 5 Conduct retrospective analyses of 1987-88 epizootic
 - 5.1 Conduct genetic analyses of archived tissue samples to identify which stock(s) were affected by the epizootic
 - 5.2 Estimate relative level of mortality for each stock
 - 5.3 Analyze age and reproductive structures of animals killed in epizootic
 - 5.4 Re-analyze patterns of strandings during epizootic to gain further insight into stock structure and epidemiology
 - 5.5 Conduct retrospective analysis of abundance using historical survey data, using information on stock structure
 - 5.5.1 Determine whether comparable data sets exist prior to and following epizootic
 - 5.5.2 Compare estimates of abundance or relative abundance prior to and following epizootic
 - 5.6 Examine the effects of new estimates of fecundity and mortality on status of stock determination
 - 5.7 Reassess status of stock(s) following epizootic
- 6 Establish a bio-monitoring program to detect incidence of morbillivirus and other diseases
 - 6.1 Collect and analyze biological samples from live strandings and Code 2 specimens from strandings and by-catches
 - 6.1.1 Histopathology
 - 6.1.2 Contaminants
 - 6.1.3 Life History
 - 6.1.4 Body Condition
 - 6.1.5 Blood chemistry, hematology, and serology (from live dolphins)
 - 6.1.6 Biotoxins
- 7 Examine factors that could potentially affect carrying capacity of coastal bottlenose dolphins
 - 7.1 Evaluate affects of changes in water quality and loss or alteration of habitat on the distribution and abundance of dolphins
 - 7.2 Evaluate affects of changes in water quality and loss or alteration of habitat on the distribution and abundance of prey
 - 7.3 Identify habitat requirements and protect areas of special biological significance, such as nursery areas
 - 7.4 Evaluate the effects of commercial harvests of prey
 - 7.5 Explore the potential effects of contaminants on endocrine, immune and reproductive function
 - 7.5.1 Collect matched tissue samples from Code 2 carcasses and from live animals during capture-release programs
 - 7.5.2 Analyze matched tissue samples from Code 2 carcasses and live animals during capture-release programs
 - 7.6 Evaluate and, where present, minimize the potential for disturbance

- 7.6.1 Military activities
 - 7.6.2 Recreational boating and commercial vessel traffic
 - 7.6.3 Dredging
 - 7.6.4 Feeding, swim-with and commercial dolphin watching programs
 - 7.7 Conduct risk assessment of vulnerability of stock(s) to anthropogenic contaminants and other factors
- 8 Establish position of Coordinator to ensure implementation of Conservation Plan
 - 8.1 Coordinate scientific efforts among federal, state, academic and private researchers
 - 8.2 Coordinate regulatory and management efforts among federal, state and local agencies
 - 8.3 Monitor and evaluate progress of implementation of Conservation Plan goals
 - 8.4 Periodically review and update Conservation Plan: Ensure that delisting criteria are met



1. General conceptual model for assessment and reduction of marine mammal takes by commercial fisheries, as required by the 1994 amendments to the Marine Mammal Protection Act.



2. Average percent observer coverage (gillnet landings in metric tons observed/total prorated commercial gillnet landings) from 1996 to 2000 by type of habitat. State coastal habitat is the ocean shelf within 4.8 km of shore (excluding bays and sounds) federal coastal habitat is the ocean shelf between 4.8 and 12 km from shore north of Cape Lookout, North Carolina, or 4.8 and 27 km from shore south of Cape Lookout, and federal offshore habitat is ocean shelf habitat outside of 12 and 27 km from shore.

EDUCATION AND OUTREACH

Bycatch Certification Training Program

For category I and II Fisheries and beginning on (date to be determined) the operator of a vessel and persons in a non-vessel fishery may not fish with, set or haul back gear, or allow gear to be in areas specified within the applicable management areas unless the operator/person has satisfactorily completed the bycatch certification training program and possesses on board the vessel a valid bycatch training certificate issued by NMFS. Notice will be given announcing the times and locations of bycatch certification training programs.

Items that need to be addressed include:

- Fishers must contact NMFS regarding training within x amount of time.
- NMFS will coordinate training opportunities throughout the year.

- Fishers have (to be determined) amount of time to receive training certificate but during that time can continue to fish.
- Frequency of re-certification to be determined by NMFS in consultation with the BDTRT; three years is the preferred alternative.

Training is to be provided by NMFS, appropriate state agencies or other designated agents in cooperation with regional contacts for regional specific guidance.

Educate fishermen as to the following elements:

- Familiarize fishers with applicable laws and regulations regarding marine mammals.
- Supply contact information and protocol for responding to an interaction, stranded animal, or floating animal.
- Encourage best fishing practices (e.g., reduce dolphin attraction to fish bycatch).

Fishery and Public Education

NMFS, in concert with cooperating parties (e.g., Fishery Management Councils, States, non-government organizations), is to develop and distribute materials.

Types of materials could include but not be limited to:

- Brochures
- Placards
- Decals (with the contact number of response personnel for interactions)
- Electronic presentations
- Videos
- Public service announcements.

NMFS and cooperating parties should distribute materials by means of the following:

- Newspapers
- Industry magazines, both commercial and recreational
- Tradeshows
- Marinas
- Fish houses
- Web sites
- Furnish with licenses
- Brochures available at fishing supply stores for both commercial and recreational gear.

The materials should include the following content:

- Industry-specific information (e.g., for the blue crab pot fishery, illustrate the dolphin's learned behavior of pot tipping and the use of modified gear to reduce it).
- Marine Mammal Protection Act information
- Protected species information
- Best fishing practices
- Ghost gear and derelict gear collection and disposal.

Education of Enforcement Agents

Educate enforcement agents, including both state and local enforcement agents, about the need to report strandings.

- Discuss their role in response and in educating the fishermen and public
- Include similar information in the fishermen's training course
- To be conducted at regional law enforcement meetings
- Incorporate a training requirement into the state/NMFS Joint Enforcement Agreements.

BLUE CRAB POT FISHERY

Because there is an active blue crab pot fishery along the entire coast where coastal bottlenose dolphins range, the BDTRT developed a separate set of non-regulatory recommendations for this fishery.

Removal of Derelict Pots

States are strongly encouraged to develop, implement, and enforce a program for the removal of derelict blue crab pots and their associated lines from any and all water bodies frequented by bottlenose dolphins. If such a program already exists within a state, that state is strongly encouraged to maintain and effectively enforce that program.

B Gear Modification

For all crab pot fishermen:

- Recommend the use of a sinking or negatively buoyant line (i.e., either nylon or polyester, so as to minimize excess line floating at the surface or loops suspended in the water column).
- Suggest that the scope of line be restricted to minimum length necessary in order to reduce the overall length of line in the water column.

Gear Modification and Research to Address Bait Stealing Behavior

For those areas where bottlenose dolphin are tipping pots and stealing bait:

- Though unquantified, the use of inverted or modified bait wells has been shown to alleviate the “bait stealing” behavior in areas of Georgia. We recommend that in areas experiencing this behavior, the use of such modified traps be encouraged.
- In as much as this modified gear has not been subjected to valid gear testing, the BDTRT recommends that modified crab pots be tested to demonstrate overall effectiveness.

Better Determination of Frequency of Interactions

NMFS should obtain accurate estimates of the numbers of bottlenose dolphins and the nature and frequency of their interactions with crab pots in estuaries, sounds, and bays.

MANAGEMENT UNITS

SUMMER NORTHERN MIGRATORY MANAGEMENT UNIT

Some members of the BDTRT felt that the Northern Migratory Management Unit of coastal bottlenose dolphins has been assigned a PBR of 46 animals. A summer season PBR of 23 animals has been allocated based solely upon an even allocation between summer and winter. The total PBR assigned for the Northern Migratory management unit and the two summer North Carolina management units, based solely upon the summer data, is 88 animals. The allocated summer and winter PBR for these management units is 67 animals. This allocation scenario assigns a total PBR, which is 21 animals less than the summer survey would indicate. This establishes a very conservative starting point.

Further, some members of the BDTRT felt that the estimated take of BND in the Northern Migratory summer management area is approximately 30 animals, requiring a reduction of 7 animals to achieve the allocated PBR. The observed dolphin take, which occurred in the shark fishery, occurred in state waters. State regulations have since made such gear illegal.

Limits on Setting of Anchored Gillnets at Night

For anchored gillnet gear, both floating and sinking, with greater than or equal to five inch stretch mesh, in the waters of Virginia north through New Jersey, in state waters from June 1 through October 31, a person or vessel shall not cause to have one or more anchored gillnets in state regulated waters of the summer northern migratory management area at night unless such person or vessel remains within one-half mile of the closest portion of each gear set. *

Any vessel that set or attended anchored gillnet gear at night must bring all gear back to port with the vessel.

*Note the following clarification: A vessel setting its gear during the day, coming back into port in the middle of the day, and planning to return to retrieve the gear later in the day, may come in without bringing in its gear.

SUMMER NORTH CAROLINA MANAGEMENT UNITS

During the course of the deliberations, both the working group and the BDTRT used a table to organize and present the recommendations for the North Carolina management units. The table is replicated in Appendix E to this report. In this section the text has been removed from the table and organized under headings and subheadings to better follow the format used in the other sections of this report.

Small Mesh Nets

The following are recommended for all gillnets with a mesh size of less than five inches along the entire coast of North Carolina.

Research & Monitoring:

Provide adequate observer coverage for small mesh fisheries, including out-of-state and recreational fishermen. Increase observer coverage for state waters, including the use of alternative platforms.

Recommendations for Gear Research:

The following gillnet modifications or fishing practices should be investigated for use within North Carolina state and federal waters to reduce the potential take of bottlenose dolphins:

- No bridle or a modified bridle is used to attach the gear to the anchor so that there is not pressure on the float rope great enough to collapse the end of the net.
- Floatation used within some (to be determined) distance of the ends of the net should have increased buoyancy relative to the floats used in the rest of the floatline.
- All multi-panel gillnets should be laced together (i.e., with rope or other specified material) such that any inter-panel distance is less than or equal to the mesh size of each panel.
- Investigate the effects of net profile (with the assumption that a shallower net would be less likely to catch dolphins).

By June 2003, the NMFS shall institute a research program to determine to the extent practicable whether the above gear modifications may provide an effective means to reduce bycatch, and NMFS will provide the results of gear modification research to the BDTRT along with any recommendations for modifications to the BDTRP. The BDTRT recommends that NMFS test and implement proven gear modifications in a timely manner.

Medium Mesh Nets

The following are recommended for all gillnets with a mesh size of between five and seven inches along the entire coast of North Carolina.

Research & Monitoring:

Provide adequate observer coverage for small mesh fisheries, including out-of-state and recreational fishermen. Increase observer coverage for state waters, including the use of alternative platforms.

Large Mesh Nets

The following are recommended for all gillnets with a mesh size of greater than seven inches along the entire coast of North Carolina.

No measures are recommended because of existing state regulations which prohibit the use of large mesh (greater than 7") from April 16 through December 15 in state waters. Instead, the BDTRT recommends that the BDTRP include existing NC state fisheries regulations prohibiting the setting of large mesh gear between April 16 and December 15.

WINTER MIXED STOCK MANAGEMENT UNIT IN NORTH CAROLINA AND VIRGINIA

Refer to appendix E for a tabular presentation of these recommendations.

Small Mesh Nets Used North of Cape Lookout to the Virginia Border

Regulations are applicable from September 1 through April 30 in state waters.

All gillnets with a mesh size of less than five inches shall be fished/hailed at least once within 24 hours.

To designate that the gear has been fished/hailed, the fishermen shall attach a flag/buoy to each end of the net at the surface and the flag/buoy color is changed every day no later than 3 PM. This flag/buoy shall be visible at the surface at a minimum distance of 500 yards. (For example, Wednesday's color could be black, which means that fishermen have until 3 PM on Wednesday to change the flag/buoy to the black color. There would be a different color every day). This is to be developed by NMFS in coordination with state representatives and the fishing industry. When implemented, the state of North Carolina intends to apply this regulation to both recreational and commercial gillnet fisheries.

Research & Monitoring:

Provide adequate observer coverage for small mesh fisheries, including out-of-state and recreational fishermen. Increase observer coverage for state waters, including the use of alternative platforms.

Recommendations for Gear Research:

The following gillnet modifications or fishing practices should be investigated for use within NC state and federal waters to reduce the potential take of bottlenose dolphins:

- No bridle or a modified bridle is used to attach the gear to the anchor so that there is not pressure on the float rope great enough to collapse the end of the net.
- Floatation used within some distance of the ends of the net should have increased buoyancy relative to the floats used in the rest of the floatline.
- All multi-panel gillnets should be laced together (i.e., with rope or other specified material) such that any inter-panel distance is less than or equal to the mesh size of each panel.
- Investigate the effects of net profile (with the assumption that a shallower net would be less likely to catch dolphins).

By June 2003, the NMFS shall institute a research program to determine to the extent practicable whether the above gear modifications may provide an effective means to reduce bycatch, and NMFS will provide the results of gear modification research to the BDTRT along with any recommendations for modifications to the BDTRP. The BDTRT recommends that NMFS test and implement proven gear modifications in a timely manner.

Small Mesh Nets Used South of Cape Lookout

All of the recommendations for small mesh nets north of Cape Lookout apply to this area with the following exceptions.

Research & Monitoring:

Adequate observer coverage needs to be provided for those South Carolina fishermen who fish in southern North Carolina waters.

Gear Research:

The one recorded bottlenose dolphin take in the kingfish fishery (which occurred in February 2000) was found to have occurred in untraditional gear with the depth of net at 70 meshes deep vs. a typical net depth of 25 to 35 meshes. As a result, it was determined to be best to address this issue through gear modifications research.

Medium Mesh Nets Used North of Cape Lookout to the Virginia Border

Regulations are applicable from September 1 through April 30 in state waters.

All gillnets with a mesh size of between five and seven inches shall be fished/hailed at least once within 24 hours.

To designate that the gear has been fished/hailed, the fishermen shall attach a flag/buoy to each end of the net at the surface and the flag/buoy color is changed every day no later than 3 PM. This flag/buoy shall be visible at the surface at a minimum distance of 500 yards. If implemented, the state of North Carolina intends to apply this regulation to both recreational and commercial gillnet fisheries.

A person or vessel shall not cause to have one or more gillnets in NC state regulated waters of the NC winter mixed management unit of bottlenose dolphin at night unless such individual or vessel remains within one half mile of the closest portion of each gear set. (The consensus for this strategy is based up the expectation that it will not result in more gear in the water and that the gear will be constantly hauled.) This is offered with the proviso that NMFS assess the amount of gear that can realistically be fished using experiments with fishermen and scientists, existing observer data, and, if possible, with experiments with fishermen in ongoing fisheries and provide that information to the BDTRT at its next meeting (i.e, within roughly 6 months).

From November 1 through April 30, no person may fish with a medium mesh gillnet at night within state waters south of the Virginia/North Carolina border to Cape Lookout unless remaining in ½ mile proximity to that gear. During that time, all gillnet set by that vessel in the waters south of the Virginia/North Carolina border to Cape Lookout must be removed from the water and placed on board the vessel before a vessel returns to port.

Should the spiny dogfish fishery be prosecuted by medium mesh due to modifications to quota allocations or seasons, the BDTRT shall revisit the issue and consider the need for establishing regulations for that fishery and other similar fisheries (including such issues as gear type, soak times, length of net, etc.).

Medium Mesh Nets Used South of Cape Lookout

All of the recommendations for medium mesh nets north of Cape Lookout apply to this area with the following exceptions.

Exclusion of the American Shad Ocean Intercept Fishery:

No night sets of gillnets within state waters, excluding floating anchored gillnet until December 31, 2004. (This exclusion is to accommodate the American shad ocean intercept fishery which will end December 31, 2004.)

Language to Reflect Area of Coverage:

From November 1 through April 30, no person may fish with a medium mesh gillnet at night within state waters south of Cape Lookout to the North Carolina/South Carolina border. At night, all medium mesh gillnets within state waters south of Cape Lookout to

the North Carolina/South Carolina border must be removed from the water with gear placed on board before a vessel returns to port.

Large Mesh Nets Used North of Cape Lookout to the Virginia Border

All gillnets with a mesh size greater than seven inches are prohibited from fishing at night without tie-downs within state waters (3 nautical miles) from shore.

Proposed sea turtle measure for gillnets with tie-downs: At all times when water temperatures are at or above 52 degrees F, gillnets with tie-downs will be prohibited from fishing within state waters. (The intent of this measure is to be consistent with the final rule for sea turtle mitigation measures in large mesh fisheries.)

The definition of tie-down is to be consistent with that used in the Harbor Porpoise Take Reduction Plan.

Large Mesh Nets Used South of Cape Lookout

All gillnets with a mesh size greater than seven inches are prohibited from fishing at night within state waters (3 nautical miles) from shore.

From November 1 through April 30, no person may fish with a large mesh gillnet at night within state waters south of Cape Lookout to the North Carolina/South Carolina border. At night, all large mesh gillnets within state waters south of Cape Lookout to the North Carolina/South Carolina border must be removed from the water with gear placed on board before a vessel returns to port.

Virginia Large Mesh Gillnets

From November 1 through December 31, no gillnet with mesh greater than seven inches may be in the water at night in state waters from the Chesapeake Bay mouth (defined as the lighthouse at the tip of Smith Island, known as the Cape Charles Light) to the North Carolina border. At night, all large mesh gillnets within state waters from the Chesapeake Bay mouth to the North Carolina border must be removed from the water with gear placed on board before a vessel returns to port.

Note that the harbor porpoise closure for large mesh gillnets (>7") from February 15 to March 15 will provide additional bottlenose bycatch reduction.

NORTH CAROLINA BEACH-BASED FISHING PRACTICES

Refer to appendix E for a tabular presentation of these recommendations.

The following are to apply to the beach-based fisheries along the entire North Carolina coast and throughout the year.

Beach Haul Seines

Any gear attached, anchored to, or fished from the beach must use 4" stretch mesh or less.

Roe Mullet Stop Nets

Any gear attached, anchored to, or fished from the beach must use 4" stretch mesh or less, with the exception that up to the first 100 yards of net from the shoreline may be up to 8" stretch mesh.

Best Management Practices

When setting long haul seine gear, fishermen shall not intentionally encircle dolphins in the gear. If a dolphin becomes entangled, the fisherman shall halt all fishing activity and release the marine mammal.

SOUTH CAROLINA, GEORGIA, AND FLORIDA MANAGEMENT UNITS

The following recommendations pertain year-round to all fisheries prosecuted seaward of the COLREGS line, unless otherwise noted. Example language for regulated and exempted waters may be found in the Atlantic Large Whale Take Reduction Plan (ALWTRP).

Possible Buyout of the Shark Drift Gillnet Fishery

The group discussed providing an endorsement by the team for a buyout of the shark drift gillnet fishery. The TRT may discuss this option at future meetings as a potential means of bycatch reduction.

Require Gear Proximity

No person may set gillnet in U.S. Atlantic waters south of the North Carolina/South Carolina border unless that gear is within ¼ nautical mile of the vessel or person, except in those instances where a state or federal fisheries regulation is more restrictive. Gear

must also be removed from the water and placed on board the vessel before a vessel returns to port.

Note: Examples of exceptions to the tending distance include the South Carolina shad fishery where the tending requirement is being within 500 feet and the Spanish mackerel fishery off south Florida which requires a soak time of no more than 1 hour and therefore limits distance from the net. Additionally, this does not pertain to the blue crab pot fishery.

Gear Marking Requirements and Limitations

In U.S. waters off South Carolina, Georgia, and Florida, no person may fish with, set, haul back, possess on board a vessel unless placed on board, or fail to remove any gear in U.S. waters off South Carolina, Georgia, or Florida, unless the gear complies with the specified gear characteristics. During this period, no person who owns or operates the vessel may allow the vessel to enter or remain in waters off South Carolina, Georgia, or Florida with gear on board, unless the gear complies with this requirement or unless the gear is stowed. In order to comply with this requirement, all specified gear in specified areas must be marked such that it is identifiable to a fisherman by a unique individual identifier (i.e., Atlantic Coastal Cooperative Statistics Program number). This may be in addition to existing requirements for individual fisheries. Each marking must be permanently affixed on the floats. Each marking must be clearly visible when the gear is hauled or removed from the water.

Non-Regulatory Recommendations—Improve Enforcement

Improve enforcement by committing additional time to at-sea inspections.

Non-Regulatory Recommendations—Improve Quality of Stranding and Observer Data

Please refer to the section on Research, Monitoring, and Observer Coverage for more information on this issue. The following recommendations were developed specifically for the SC/GA/FL management units.

- Increase levels of stranding coverage.
 - Provide statistically viable sample sizes throughout all fisheries and sub-fisheries interacting with bottlenose dolphins. Implement a rotational schedule to achieve observer coverage or alternative monitoring programs for all such category II fisheries.
 - The level of coverage would depend on the level of effort and bycatch rate for each fishery.

- Improve training of network participants (especially as to the identification of fisheries interactions).
- Improve observer training and provide observers with adequate equipment.
- Establish dedicated beach surveys in areas and during times where observer coverage is lacking.
- Improve post-mortem assessments by the stranding network. (Especially the assessment of potential interactions between bottlenose dolphins and commercial-type crab pot gear).
 - NMFS should provide funding to organize and conduct a workshop/training session to bring together the information and people necessary to accomplish this objective.
 - The results of the workshop should be compiled in a document or other format (for example, training manual, photos, PowerPoint presentation, or video) that would be used to train additional stranding network personnel.
 - The protocol should include the involvement of fishermen in the assessment of stranded dolphins with evidence of entanglement and in the examination of any gear retrieved.
 - NMFS should establish a repository for gear removed from stranded dolphins and other marine mammals. Gear would be stored and cataloged for future reference.
 - Information about crab pot entanglements learned from the assessment of stranded animals should be conveyed to the fishermen through the outreach and education component of the plan.
- Improve the observation of, reporting of, and response to stranded bottlenose dolphins in inside waters.
 - In states where it does not exist, NMFS should provide funding for a toll-free reporting hotline to facilitate the timely reporting and response to stranded marine mammals.
 - NMFS should provide funding to organize and conduct formal trainings/workshops for state and local marine patrols (and other invitees) regarding marine mammal-fisheries interactions and their role in supporting the stranding network.
 - NMFS should formally request that federal, state and local marine patrols monitor inside waters for any evidence of bottlenose dolphin mortalities or fisheries interactions, including the blue crab fishery.
 - NMFS should formally request that federal, state and local marine patrols assist the stranding network in responding to stranded marine mammals.
 - NMFS should provide funding for directed aerial, vessel or shore-based surveys in areas and/or seasons of concern.
- Improve communication between the stranding network and the observer programs. This should provide for real time communication.
- Improve the frequency and coverage of abundance surveys. This should be done especially in southern states and estuarine waters. Ensure adequate coverage. Conduct a power analysis of how capable we are now to detect and assess 30% or 50% changes in takes.

APPENDIX A:

BOTTLENOSE DOLPHIN TAKE REDUCTION TEAM MEMBERSHIP

Mike Baker
SE Shark Gill Net Assn.

David A. Beresoff
Beresoff Fishing Company

Tina Berger
Atlantic States Marine Fisheries
Commission

Paul Biermann
Carteret County Fisherman's
Association

Gordon Colvin
New York Dept. of Environmental
Conservation

David Cupka
South Carolina Wildlife and Marine
Resources

Joseph DeAlteris
University of Rhode Island

Martin Dunson
First Coast Soft Crab Company

Lewis S. Gillingham
Virginia Marine Resources Commission

Charlotte Gray
Oceana

Mike Greco
Delaware Division of Fish and Wildlife

Douglas Guthrie
North Carolina Stop Net Fishing

Bruce A. Halgren
New Jersey Division of Fish and
Wildlife

Chris Hickman

Fulton Love

Richard Luedtke
Garden State Seafood Assn.

Rick E. Marks
Garden State Seafood Assn.
c/o Robertson, Monagle & Eastaugh

Dave Martin

William McLellan
Biological Sciences & CMS
UNC Wilmington

Emily Hanson Menashes
Office of Protected Resources
NOAA Fisheries

Ken Moran

Fentress "Red" Munden
North Carolina Division of Marine
Fisheries

Robert E. Munson
New Jersey Watermen's Association

Margaret Murphy

South Atlantic Fishery Management
Council

Peter Nixon

William Outten
Maryland Dept. of Natural Resources

Mike Peele

Carl A. Poppell
Georgia Blue Crab Issues Subcommittee

Tim Ragen
U. S. Marine Mammal Commission

Andrew Read
Duke University

John E. Reynolds
U. S. Marine Mammal Commission
c/o Mote Marine Laboratory

Sentiel "Butch" Rommel
Florida Fish and Wildlife Conservation
Commission

Jerry Schill
North Carolina Fisheries Association

Richard Seagraves
Mid-Atlantic Council

W. Mark Swingle
Virginia Marine Science Museum

Leonard Voss
Delaware Waterman

Christopher Walker
Eastern Shore Waterman's Association

Kathy Wang
Protected Resources Division
National Marine Fisheries Service

Robert A. West

A. D. (Drew) Willis
Coastal Conservation Association

David Woolman
South Carolina Crabbers Assn.

Nina M. Young
The Ocean Conservancy

Sharon Young
The Humane Society of the U.S.

Christopher Zeman
American Oceans Campaign

Barb Zoodsma
Wildlife Resources Division

Appendix B

Bottlenose Dolphin Take Reduction Team Meeting Schedule

Meeting Dates	Meeting Type	Meeting Length	Primary Topics	Location
May 15- 16 2001	BND/Fishery Interaction Workshop # 1	5/15: Full day 5/16: Full day	TRT basics, Dolphins and fisheries	Sheraton Atlantic Beach, Atlantic Beach, NC
July 11 – 12	BND/Fishery Interaction Workshop # 2	7/11: Full day 7/12: Full day	Fisheries; dolphin inter- actions	Raleigh- Durham airport Holiday Inn, NC
Sept. 12 – 13	BDTRT # 1	Meeting postponed due to 9/11 events	Introduction; Issues and options	Sheraton Airport (BWI) Baltimore MD
Nov. 6 – 8	BDTRT # 1	11/6: full day 11/7: full day 11/8: ½ day	Introduction; Topics and issues	Sheraton Hotel, Virginia Beach, VA
Jan. 23 – 25, 2002	BDTRT # 2	1/23: full day 1/24: full day 1/25: half day	Issues and options	Ramada Inn Wilmington, NC
Feb. 27 – Mar. 1	BDTRT # 3	2/27: full day 2/28: full day 3/1: half day	Issues and options	Sheraton Hotel Virginia Beach VA
Mar. 27 – 28	BDTRT # 4	3/27: full day 3/28: full day	Synthesis of selected options	Hilton Hotel Wilmington, NC
April 23 – 25	BDTRT # 5	4/23: full day 4/24: full day 4/25: full day	Completion of consensus Take Reduction Plan for submission to NMFS by May 7, 2002	Holiday Inn – Inner Harbor Baltimore, MD
Later, during rulemaking public comment period	BDTRT # 6	Full day Full day (tentative)	BDTRT review of draft rules, recommend- ations to NMFS	Washington DC Or Virginia Beach, VA

APPENDIX C: AVAILABILITY OF MEETING SUMMARIES

The facilitators wrote meeting summaries for each of the five BDTRT meetings and for the two pre-team workshops. Copies of these summaries may be obtained by contacting:

Katie Moore, Fishery Biologist
National Marine Fisheries Service
Protected Resources Division F/SER3
9721 Executive Center Drive N
St. Petersburg, FL 33702
727-570-5312
727-570-5517 (FAX)

APPENDIX D: LETTER TO DR. W. HOGARTH, NMFS, REGARDING THE 2002 WINTER SURVEY

Bottlenose Dolphin Take Reduction Team

c/o The Georgia Environmental Policy Institute
380 Meigs St. Athens, GA 30601
706.546.7507

March 28, 2002

Dr. William Hogarth
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910

Dear Dr. William Hogarth:

The Bottlenose Dolphin Take Reduction Team, in consensus, respectfully requests that NMFS expedite the analyses of the 2002 winter survey for bottlenose dolphin, including biopsy results. We further request that the Atlantic SRG review these analyses and provide recommendations to the NMFS prior to the Bottlenose Dolphin Take Reduction Team meeting scheduled during the public comment period for the proposed rule. We would ask that your office ensure that the necessary resources are provided to accomplish this request so that we can achieve a fair and scientifically sound set of recommendations.

Thank you for your consideration in this matter.

Respectfully,

Dr. James A. Feldt, Facilitator
On behalf of the Bottlenose Dolphin Take Reduction Team

cc: Bob Kenney, Don Knowles